

their place an outline of the natural arrangement adopted by De Candolle and most modern systematic writers. - We think that 150 pages devoted to this latter part of the science is almost altogether out of place in a book "intended to give the important facts of botanical science as briefly and popularly as possible."

But we must not be misunderstood. This is an excellent book, and well fitted to follow a "brief and popular" primary volume, such as Henfrey's 'Rudiments.' It will even, we suspect, supersede Balfour's 'Manual' in many places where that has been usually employed: this is a misfortune; for the 'Manual' is far better fitted for the more advanced student than are these 'Outlines.'

## PROCEEDINGS OF LEARNED SOCIETIES.

### ZOOLOGICAL SOCIETY.

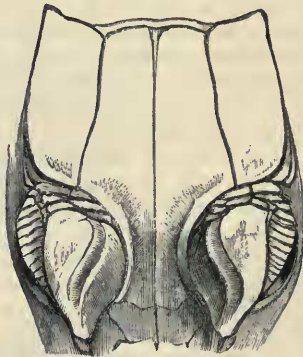
June 24, 1862.—E. W. H. Holdsworth, Esq., F.L.S., in the Chair.

DESCRIPTION OF *CROCODILUS FRONTATUS*, A NEW CROCODILE FROM OLD CALABAR RIVER, WEST AFRICA. BY ANDREW MURRAY, ASSIST. SECRETARY, ROYAL HORTICULTURAL SOCIETY.

*CROCODILUS FRONTATUS*, nov. sp.

Head broad and deep, much broader than in *C. vulgaris*, very flat on the vertex, and with the margins of the flat portion slightly raised; the lateral margins very slightly curved; the suture inside of the lateral margin placed at rather more than a fourth of the breadth of the vertex from its side. This suture is not throughout parallel to the lateral margin; it is nearly so for about two-thirds of its

Fig. 1.



posterior length; towards the front it bends a little outwards. Fig. 1 shows the form of the sutures in this species, while fig. 2 shows their form in *C. vulgaris*, and fig. 3 in *C. leptorhynchus*. The ver-

tex in the two last, although flattened, is not so depressed, but is slightly rounded, so as to be somewhat higher at the middle than at

Fig. 2.

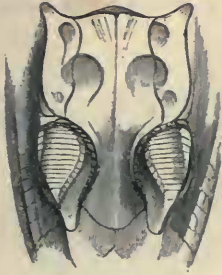


Fig. 3.



the margin. The colour in *C. frontatus* is yellowish with blackish spots, instead of brown with blackish spots, as in *C. vulgaris* and *C.*

Fig. 4.

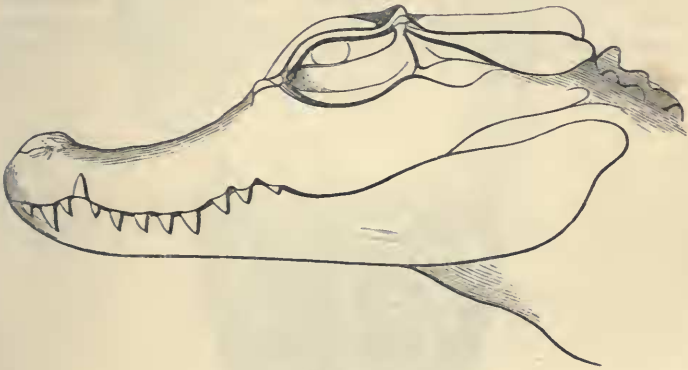


Fig. 5.



*leptorhynchus*. The muzzle is shorter than in either of the others, deeper, and the front rises higher above it; the nostrils are more

prominent and turned up. Both the head and the lower jaw are deeper than in *C. vulgaris* and *C. leptorhynchus*. (See fig. 4, which represents the head of *C. frontatus* seen in profile, and figs. 5 and 6, which respectively represent the profiles of the head of *C. vulgaris* and *C. leptorhynchus*.) The disposition of the scuta or plates along

Fig. 6.



the nose or muzzle is different in each species. Fig. 7 shows them in *C. frontatus*; fig. 8, in *C. vulgaris*; and fig. 9, in *C. leptorhynchus*. It will be seen that the arrangement in *C. frontatus* is much nearer that in *C. vulgaris* than that in *C. leptorhynchus*, which is upon

Fig. 7.

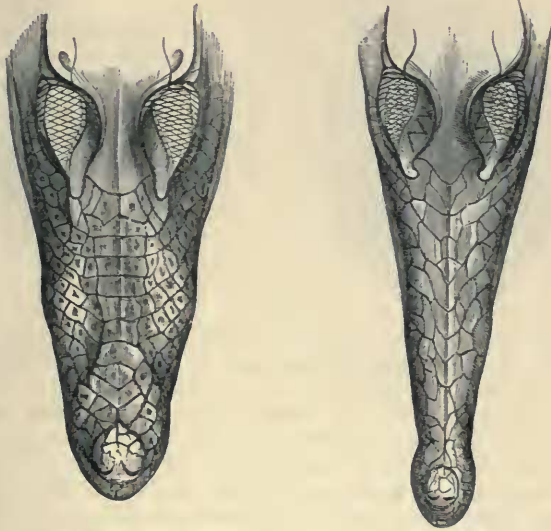


a totally different plan, the middle space in it being free from scuta, soft, and smooth, with transverse wrinkles or lines, while in the other two the space is covered with scuta, those in the middle being transverse. The commencement of these transverse scuta between the eyes is also different.

The scuta on the nape of the neck are differently proportioned and placed in all three; and here the arrangement in *C. frontatus* bears most affinity to that of *C. leptorhynchus*, instead of to that of *C.*

Fig. 8.

Fig. 9.



*vulgaris*. Fig. 10 shows this arrangement in *C. frontatus*; fig. 11, in *C. vulgaris*; and fig. 12, in *C. leptorhynchus*. In *C. frontatus*

Fig. 10.



and *C. leptorhynchus* the four large scuta are of a subquadrangle form; in *C. vulgaris* they are irregularly subhexagonal. In the latter, not only these but also the scuta generally are flat, with a longitudinal raised line or carina. In *C. leptorhynchus*, those in the neighbour-

hood of the four larger scuta bear a projecting oblong umbo; and *C. frontatus* has this developed in a manner still more marked.

Fig. 11.

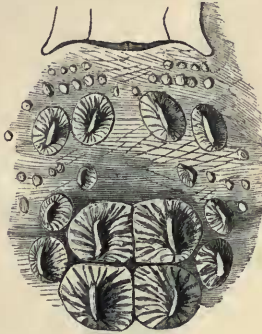
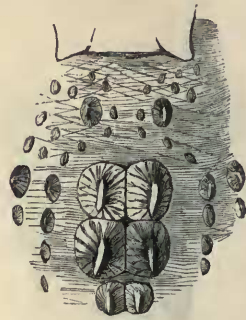


Fig. 12.



The same character prevails in the rest of the scuta. In all three species there are six rows of large scuta down the back, varying in width, diminishing to four rows in the lumbar region. In *C. vulgaris* these scuta are flat, with only a slightly raised longitudinal line or carina. In *C. leptorhynchus* this carina is much more raised, so as to form regular crests. In *C. frontatus* some of them have an oblong umbo, others a crest, and others only a raised line: the affinity in this respect is greater with *C. leptorhynchus* than *C. vulgaris*. It is the same with regard to the crest down the tail. In all three the rows of dorsal scuta down the back become only four in number after passing the hind legs, forming four raised lines, two on each side of the spine; the inner crests or lines on each side then gradually approximate (in *C. vulgaris* forming a narrow channel) and thin off and become obliterated. The outer crest on each side, at about the seventh or eighth joint behind the hind legs, becomes broader and spreads out into a flat plate or leaf turned out horizontally on each side. There are about seven joints in which this flat table-shaped position of the scuta occurs, and about the same number prevails in all three. As this disposition, however, does not commence suddenly at any particular joint, but proceeds by gradations out of the crest on the back, the number may be modified according to the degree at which the observer reckons the horizontal leaf to commence. The size of these scuta is proportionally larger in *C. frontatus* and *C. leptorhynchus* than in *C. vulgaris*. These horizontal thin scuta extend one on each side for a certain distance; and then all at once the double row ceases, and is replaced by a series of single erect scuta running down the top of the tail. In my specimens the number of joints before this single crest commences, reckoning from immediately behind the hind legs, is as follows:—

<i>C. vulgaris</i> .....	18
<i>C. leptorhynchus</i> .....	17
<i>C. frontatus</i> .....	13

And the number of erect terminal joints is—

<i>C. vulgaris</i> .....	26
<i>C. leptorhynchus</i> .....	19
<i>C. frontatus</i> .....	19

The colouring of *C. frontatus* is much nearer that of *C. leptorhynchus* than *C. vulgaris*. The latter is coloured pale ashy brown, blotched irregularly with dark brown. The other two have the dark blotches distributed in transverse bands,—*C. frontatus* having every alternate two rows of transverse scuta pale and dark—a disposition followed in *C. leptorhynchus*, but not so regularly.

Total length of my specimen, 21 inches; total length of head, from tip of snout to back of under jaw,  $3\frac{1}{2}$  inches; breadth of head,  $1\frac{3}{4}$  inch; length of muzzle to front of eye,  $1\frac{1}{4}$  inch; length of eye, nearly 1 inch; height of head, 2 inches; length of body, from occiput to back of hind legs, 8 inches; total length of tail, 12 inches; length of tail to commencement of single crest,  $5\frac{1}{2}$  inches; length of the part of it with single crest,  $7\frac{1}{2}$  inches.

On the whole, this new species seems to combine many of the characters both of *C. vulgaris* and *C. leptorhynchus*. In its head it is nearest to *C. vulgaris*; in its colouring, scuta, and tail to *C. leptorhynchus*.

I owe this specimen to the kindness of the Rev. W. C. Thomson, the accomplished missionary at Old Calabar. He wrote me word long before I received it that there was another species of Crocodile in the Old Calabar besides the two generally known, that it was extremely scarce, but that he would endeavour to procure a specimen for me. He did so, and sent me the individual from which this description is taken, alive. It reached Liverpool in good health, but, most unfortunately, was drowned on the railway on its passage to Edinburgh. The gentleman who was kind enough to charge himself with it thought it would not live unless brought in water, and he put it in a foot-pail half full of water. The water was too deep to allow the poor animal to rest on the bottom of the pail and stretch up its head for breath; and when the jolting of the railway commenced, it was kept in a constant state of submersion. The consequence which might have been anticipated ensued, and my Crocodile arrived dead. There is no doubt that it is a good species, half-way between *C. vulgaris* and *C. leptorhynchus*.

NOTE ON THE HABITS AND AFFINITIES OF THE KAGU  
(RHINOCETUS JUBATUS). BY A. D. BARTLETT.

At the first sight of this bird, one is struck with its resemblance to several different genera, and at once calls to mind *Eurypyga*, *Ædionemus*, *Cariama*, *Psophia*, *Nycticorax*, and *Scopus*: one and all appear more or less represented in its singular combination of characters.

The actions and movements of the Kagu are generally quick and lively, so opposite to the slow and chameleon-like movements of the true Herons that one can hardly suspect it to be an Ardeine bird.

This, however, it doubtless will prove to be, but so modified and adapted to a different kind of diet and mode of life, that its real affinities are difficult to recognize.

With its crest erect, and wings spread out, the Kagu runs or skips about, sometimes pursuing and driving before him all the birds that are confined with him in the same aviary [among these are several Blue Waterhens (*Porphyrio*)], evidently enjoying the fun of seeing them frightened; at other times he will seize the end of his wing or tail and run round, holding it in his bill: from a piece of paper or dry leaf he derives amusement by tossing it about and running after it. During his frolic he will thrust his bill into the ground and spread out his wings, kick his legs in the air, and then tumble about as if in a fit. At other times he appears intent upon catching worms: he steps slowly, his neck close to his body, his crest flat on his back, all his feathers smooth and close; he raises one foot, and with two or three gentle strokes he paws the ground, swiftly he darts his bill into the earth and draws forth a worm, a sudden shake and it is swallowed; again he runs; stopping suddenly, he makes another dart; and thus he continues to capture this kind of food. With respect to feeding, this bird differs much from the Heron family, seeking out, in every hole and corner, worms, snails, and other living things, whenever they are not in motion: as soon as a snail is found, he breaks its shell by repeated knocks upon the ground, and after shaking the fragments of the broken shell off, the animal is swallowed. In no instance, however, that I have observed, does this bird eat bread, seed, or any kind of vegetable, but he strictly confines himself to insects and other animal substances.

The skeleton and internal anatomy of the Kagu being entirely unknown to me, I can only form an opinion of the affinities of this bird by its external characters, habits, &c.; and I find that the remarkable powder-down tufts, which are well developed in all the Ardeines, are carried to a greater extent in this bird; for above and around the wings, on the breast beneath the wings, and on the back and belly, this structure exists, and the enormous quantity of the white powder given off is surprising. I have seen the bird enter the small pond and attempt to wash; and upon dipping partly under water, the whole surface of the water was covered with a white film, like French chalk. The strong resemblance between this bird and *Eurypyga*, even in the markings upon the wing- and tail-feathers, the mode of spreading out the wings, and other resemblances, convince me that I am right in considering the Kagu to be more closely allied to *Eurypyga* than to any other bird that has come within my notice.

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#### MISCELLANEOUS.

*Notice of a Flycatcher new to the Fauna of Great Britain.*

By G. R. GRAY.

AN imperfect specimen of a bird in flesh has been received from G. A. Copeland, Esq., of Carneythenack House, Constantine, near